GEOTECHNICAL INVESTIGATION REPORT
PROPOSED MONUMENT SIGNS
CITY OF CORCORAN
CORCORAN, CALIFORNIA

BSK ASSOCIATES

BSK G09-102-11F

Prepared For:

City of Corcoran
832 Whitley Avenue
Corcoran, California 93212

September 14, 2009

BSK

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VIA US MAIL & E-MAIL

September 14, 2009 **BSK G09-102-11F**

Mr. Steve Kroeker
Public Works Director
City of Corcoran
832 Whitley Avenue
Corcoran, California 93212

SUBJECT: Geotechnical Investigation Report
Proposed Monument Signs
City of Corcoran
Corcoran, California

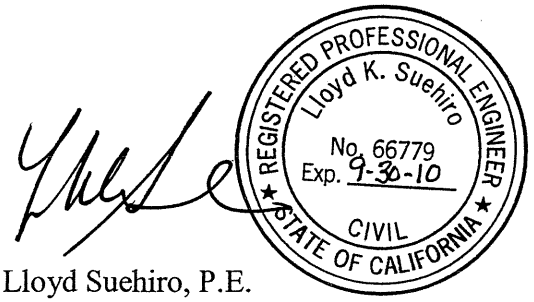
Dear Mr. Kroeker:

BSK Associates is pleased to submit our Geotechnical Investigation Report for the proposed monument signs in Corcoran, California. The geotechnical investigation, which included a field exploration, laboratory testing program, engineering analysis, and preparation of this report, was conducted in accordance with BSK Proposal GF09-3529 dated August 6, 2009. The enclosed report provides geotechnical recommendations for use in preparation of plans and specifications for the subject project.

We appreciate the opportunity to assist you during the design phase of your project and look forward to continuing our relationship on this project through construction. Please contact us for questions or comments.

Sincerely,
BSK ASSOCIATES

Marshall Robinson, G.I.T.
Staff Geologist



Lloyd Suehiro, P.E.
Senior Engineer

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GEOTECHNICAL INVESTIGATION REPORT
PROPOSED MONUMENT SIGNS
CITY OF CORCORAN
CORCORAN, CALIFORNIA

1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of our Geotechnical Engineering Investigation for the proposed Monument Signs (Sites) as shown on the Vicinity Map, Figure 1. The geotechnical engineering investigation was conducted in general accordance with the scope of services outlined in BSK Proposal GF09-3529, dated August 6, 2009. This investigation was conducted on behalf of The City of Corcoran (Owner/Client). The project layout with the locations of our exploratory borings is shown on Figure 2, Boring Location Map.

1.2 PROJECT DESCRIPTION

BSK understands that the project will consist of replacing two existing sign monuments for the City of Corcoran. The existing "Welcome" Signs are located at intersection of Santa Fe Street and Highway 43 (Site 1) on the north side of the City and the other sign is on the northwest corner of the intersection of Whitley Avenue and Highway 43 (Site 2).

The proposed monument signs will be precast concrete and will be installed on shallow spread footings or a grade beam foundation and placed behind or between the existing stone facade pedestals. The signs will be approximately 17.5 feet tall and 30 feet in length. Bracing with deadman block footings will be constructed to resist overturning moment of the sign. The anticipated foundation static loads are less than 2,000 pounds per square foot.

Due to the size of the proposed sign, the existing pedestals will not provide support for the structure but will remain as a decorative feature. The existing landscape planters that are between the pedestals may obstruct the construction and installation of the sign foundations and may need to be removed. Otherwise provision must be provided to maintain the planter's structural integrity during construction.

In the event that significant changes occur in the design or location of the proposed building, this report's conclusions and recommendations will not be considered valid unless the changes are reviewed with BSK and the conclusions and recommendations are modified or verified in writing.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of this geotechnical investigation is to assess soil conditions at the project site and provide geotechnical engineering recommendations for use by the project designers during preparation of the project plans and specifications. The scope of the investigation included a field exploration, laboratory testing, engineering analysis, and preparation of this report.

2.0 FIELD INVESTIGTION AND LABORATORY TESTING

2.1 FIELD INVESTIGATION

Our field investigation consisted of a site reconnaissance and subsurface exploration for each Site. Test borings were drilled 10 feet below ground surface (bgs) at accessible areas within the area of the planned improvements at each location using a 4-inch diameter hand auger. Two (2) test borings were drilled at each Site for a total of four test borings. The approximate location of the test borings are indicated on Figure 2, Boring Location Map. Details of the field exploration and the boring logs are provided in Appendix A.

2.2 LABORATORY TESTING

Laboratory testing of selected samples was performed to evaluate their physical and engineering characteristics and properties. The testing program included: in-situ moisture and density, shear strength, and corrosion potential. The in-place moisture and dry density test results are presented on the boring logs in Appendix A. Descriptions of the test methods that were performed are provided in Appendix B.

3.0 SITE CONDITIONS

The following sections address site description, surface and subsurface conditions, and groundwater conditions. These are presented based on BSK's field exploration, and published maps and reports.

3.1 SITE DESCRIPTION AND SUBSURFACE CONDITIONS FOR EACH SITE

The following site description and subsurface conditions provide general location and surface and subsurface conditions for each Site. The boring logs in Appendix A provide a more detailed description of the soils encountered in each boring, including the applicable Unified Soil Classification System symbol. The locations of the borings are shown on the Boring Location Map, Figure 2.

3.1.1 Site 1 - Santa Fe Avenue and Highway 43:

Site 1 is located along the northern city limit at the corner of Santa Fe Avenue and Highway 43 in the southeast quarter of the southwest quarter of Section 11 of Township 21 South, Range 22 East, Mount Diablo Base and Meridian. The coordinates for the site location are 36.1118° North Latitude and 119.5661° West Longitude. The existing ground surface elevation is approximately 208 feet above mean sea level.

The area is predominantly rural agricultural with some commercial and industrial developments located to the south and west of the site. The topography of the site is relatively flat. The area is landscaped with trees, shrubs, and grass. Mature landscape trees are within a four feet distance from the rear of the existing sign.

The subsurface soils encountered in the test borings consisted of silty sand, silty clay, sand, and sandy clay. The near surface soils within the upper 2 feet consisted of dry, silty sand with roots. Firm silty clay was encountered at 2 feet below ground surface (bgs). A moist soil profile was encountered below 2 feet bgs. Firm sand was encountered below 5 feet bgs and was underlain by very stiff sandy clay.

3.1.2 Site 2 - Whitley Avenue and Highway 43:

Site 2 is located along the eastern city limits at the northwestern corner of Whitley Avenue and Highway 43 in the northeast quarter of the southwest quarter of section 13 of Township 21 South, Range 22 East, Mount Diablo Base and Meridian. The coordinates for the site location are 36.0982 North Latitude and 119.5463 West Longitude. The existing ground surface elevation is approximately 212 feet above mean sea level.

The area is predominantly rural agricultural with an airport landing strip which is south of the site. The topography of the site is relatively flat. The area is landscaped with trees, shrubs, and grass. A row of mature trees are within a foot distance from the rear of the existing sign. The existing planter island between the sign pedistals has some cracks along the mow strip and a notable irrigation leak adjacent to the front of the sign.

The subsurface soils encountered in the test borings consisted of silty clay, sand, and sandy clay. The near surface soils within the upper 4 feet consisted of a very stiff to hard silty clay. The upper two feet of soil profile was dry with a moist soil profile was encountered below 2 feet bgs. Below 4 feet, firm sand and interbedded silty clay seams were encountered to approximately 8 feet bgs which was underlain by hard sandy clay.

3.2 GROUNDWATER

Groundwater was not encountered in the test borings at the time of the field exploration. Based on State of California Department of Water Resources the groundwater was indicated at an elevation of approximately 120 feet or a depth greater than 80 feet below the existing ground surface. However, the possibility of the groundwater table rising to shallower depths and/or the presence of perched groundwater may occur due to irrigation of neighboring fields, seasonal effects, or other factors not evident at the time of the investigation.

3.3 GEOLOGIC SETTING

The Sites are located in Corcoran area within the Great Valley geomorphic province. Corcoran is located in the structural region identified by Bartow, 1991 as the San Joaquin Valley portion of the southern Sierran block. This area forms a broad syncline with deposits of marine and overlying continental sediments, Jurassic to Holocene in age. The thickness of the sediments increases to the west and reach a thickness of as much as 20,000 feet on the west side of the San Joaquin Valley syncline.

The Corcoran area is situated on Recent age alluvial fan sediments and basin deposits. Crystalline bedrock is anticipated to be at depths greater than 1,000 feet.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 GENERAL

Based upon the data collected during this investigation, it is our opinion that there are no soil conditions which would preclude or significantly impact the construction of the proposed improvements.

The near-surface soils in the sign areas consist primarily of silty sand and silty clay that may be considered to have medium expansion potential for design purposes. The planned improvements

may be supported on shallow reinforced concrete footings or grade beam with deadman block footings provided that the recommendations presented herein are incorporated in the design and construction of the project.

Our field exploration encountered near surface soils which have a dry zone with roots within the upper 2 feet at both Sites. Additionally, the areas of the proposed sign monuments have mature trees which are in close proximity or immediately in the foundation area. The trees will be removed and the underlying soils will be greatly disturbed due to the root removal. We anticipate the disturbed zone will be at least 3 feet deep and potentially deeper if the roots project downward in to the soil. The proposed foundations must be prepared on a moisture conditioned, compacted engineered fill. The Sites must be prepared as recommended in Section 4.4 to provide a firm, uniformly placed engineered fill below the foundation. Furthermore, the foundation must be embedded as recommended in Section 4.5 Foundations to minimize moisture variations due to the effects of soil suction and potential drying of underlying silty clay below the foundation.

The proposed foundation will be in close proximity to the existing pedestal foundations and planter. The proposed sign foundations will encroach on the existing planters. The existing landscape planter must be removed for the placement of the proposed foundations. If the planter is to remain, provisions must be provided to maintain the planter's structural integrity during construction or the planter may be reconstructed following the construction of the sign monuments. The planter must not contain landscaping immediately next to the proposed foundation due to the potential of over watering and water migration of landscape water into the foundation soils. Excess water from landscape watering may induce potential settlement of the sign structure.

The depth of the existing pedestal foundations are unknown but are expected to be embedded at least 2 feet. The over-excavation for the new foundation will extend to 3-feet and may encroach within a projected 1H:1V zone that extends outward from the bottom edge of existing pedestal foundations. Excavations made close to existing pedestals may cause loss of lateral support on the cut face of the excavation as well as potential soil bulge at the bottom of the new excavation due to removal of over-burden and soil confinement. This condition can cause possible settlement of the existing pedestals.

To mitigate potential settlement caused by excavating close to and below existing pedestals is to provide an excavation that does not undermine the existing foundations. Consideration should be taken to installing a temporary shoring system with bracing or underpinning of the existing pedestals. The shoring system should take into consideration adjacent developments that may be influenced in the construction process. In addition to bracing and shoring, the excavation must not be left open for a prolonged period of time to allow lateral forces in the soil to mobilize, thus backfill and compaction must be immediately conducted to fill the excavation.

Further evaluation must be considered for proposed excavations that extend below existing foundations prior to construction bidding. A shoring and underpinning contractor should be consulted regarding the selection of a suitable shoring system and its installation.

4.2 SEISMIC DESIGN CRITERIA — 2007 CBC

There are no known active fault zones within 30 miles of the project site. Based on our understanding of the geologic setting at the project site, the sampler blow counts and correlated Standard Penetration Test (SPT) "N" values from our soil borings, and in accordance with Table 1613.5.2 of the 2007 California Building Code (CBC), the site can be classified as Site Class D ($15 \leq N \leq 50$).

Use of the 2007 California Building Code (CBC) seismic design criteria is considered appropriate and the following parameters should be considered applicable for the structural design of structural improvements:

Table 1 - 2007 California Building Code (CBC) Seismic Design Criteria

Seismic Design Parameter	Value		Reference
MCE Mapped Spectral Acceleration (g)	$S_S = 0.69$	$S_1 = 0.29$	USGS Mapped Value
Amplification Factors (Site Class D)	Fa = 1.25	Fv = 1.83	Table 1613.5.3
Site Adjusted MCE Spectral Acceleration (g)	$S_{MS} = 0.86$	$S_{M1} = 0.52$	Equations 16-37, 38
Design Spectral Acceleration (g)	$S_{DS} = 0.57$	$S_{D1} = 0.35$	Equations 16-39, 40
Design Peak Ground Acceleration ($S_{DS}/2.5$) (g)	PGA = 0.23		CGS Note 48

As shown above, the mapped spectral acceleration parameter at 1-second period (S1) is less than 0.75, therefore the site lies in Seismic Design Category D as specified in Section 1613.5.6 of the 2007 CBC. Based on our subsurface exploration and our knowledge of the geologic setting, there is no significant risk of ground rupture, liquefaction, or seismic settlement to occur at the subject site during a design-level seismic event.

4.3 SOIL CORROSIVITY

A soil sample was analyzed to evaluate the potential for concrete deterioration or steel corrosion due to attack by soluble salts in the on-site soils. Based on the test results, on-site, near-surface soils have low soluble sulfate and chloride contents and are neutral. Thus, on-site soils are considered to have a low corrosion potential with respect to buried concrete. We recommend that Type I/Type II cement be used in the formulation of concrete and buried reinforcing steel protection with a minimum concrete cover required by the American Concrete Institute (ACI) Building Code Requirements for Structural Concrete, ACI 318-95, Chapter 7.7. Buried metal conduits should have a protective coating in accordance with the manufacturer's specifications. If detailed recommendations for corrosion protection are desired, a corrosion specialist should be consulted.

4.4 SITE PREPARATION AND EARTHWORK CONSTRUCTION

The following procedures must be implemented during site preparation for the proposed site improvements. It should be noted that all references to maximum dry density, optimum moisture content, and relative compaction are based on ASTM D 1557-02 (or latest test revision) laboratory test procedures.

1. Within the area of the planned sign, trash, debris, and the near-surface soils containing vegetation, roots, or other objectionable organic matter must be stripped a minimum of 3 inches to expose a clean soil surface. Tree roots should be grubbed out to a depth of three feet below existing grade. As a minimum, roots should be removed until there is less than three percent organic material in the soil by volume and no roots greater than ½-inch are present. *The Geotechnical Engineer's representative must inspect the bottom of the excavation created by the stripping, grubbing, and tree removal to determine if the organic-rich soils have been properly removed. The Geotechnical Engineer's representative must evaluate subsurface conditions if root removal extends below 3 feet in depth.* Although organic-rich strippings and/or grubbed materials should not be used in engineered fill, they can be used in landscape areas.
2. Where undocumented fill, existing underground utilities, irrigation pipes, or underground structures are present, they must be removed or moved to a point at least 3 feet horizontally outside the foundation areas. All resultant cavities must be backfilled with engineered fill.
3. Following the required stripping, tree removal and/or removal of underground obstructions as indicated above, the exposed surface in the planned foundation area must be over-excavated a depth of 3 feet below the existing grade. The over-excavation must extend at least 3 feet laterally outside of the foundation areas. *The exposed ground surface must be inspected by the Geotechnical Engineer to evaluate if any loose or soft zones are present that will require additional over excavation.*
4. After completing the required over excavation, the exposed subgrade must be scarified to a depth of 8 inches, moisture conditioned 2 percent above optimum moisture content and compacted to at least 90 percent of the maximum dry density.
5. Excavated soils, free of organic materials or deleterious substances, may be replaced as compacted engineered fill. Concrete fragments and/or asphalt concrete (AC) grindings, measuring greater than 2 inches, must be crushed and may be placed in compacted engineered fill providing the concrete and AC fragments are properly mixed into a matrix of friable soils. Concrete and AC fragments must not exceed 10 percent of the soil mass. Engineered fill must be placed in uniform layers not exceeding 8 inches in loose thickness, moisture conditioned to 2 percent above optimum moisture content, and compacted to at least 90 percent relative compaction.
6. All import fill materials must be free from organic materials or deleterious substances. The project specifications should require the contractor to contact BSK for review of proposed import fill materials for conformance with these recommendations prior to importing to the Site, whether from on-site or off-site borrow areas. All imported fill soils must be non-hazardous, non-expansive, and be derived from a single, consistent soil type source conforming to the following criteria:

Maximum Particle Size:	3"
Percent Passing #4 Sieve:	65% - 100%
Percent Passing #200 Sieve:	20 – 50
Expansion Index:	less than 20
Low Corrosion Potential:	
Soluble Sulfates < 1,500 mg/Kg	
Soluble Chlorides < 300 mg/Kg	
Soil Resistivity > 6,000 ohm-cm	

If at all possible, grading and paving operations should be scheduled as to avoid working during periods of inclement weather. Should these operations be performed during or shortly following periods of inclement weather, unstable soil conditions may result in the soils exhibiting a "pumping" condition. This condition is caused by excess moisture, in combination with compaction, resulting in saturation and zero air voids in the soils. If this condition occurs, the adverse soils will need to be over-excavated to the depth at which stable soils are encountered, and replaced with suitable soils compacted as engineered fill. Alternatively, the Contractor may proceed with grading operations after utilizing an alternative method of soil stabilization, which should be subject to review and approval by BSK prior to implementation.

4.5 FOUNDATIONS

Provided that the site is prepared as recommended above, the proposed monuments should be supported on foundations bearing on engineered fill. Spread footings or grade beams should be designed with steel reinforcing as recommended by the Project Structural Engineer.

4.5.1 Spread Footings

Spread footings should have a minimum width of 24 inches. Proposed spread footing foundations should extend a minimum depth of 24 inches below the lowest adjacent sub-grade surface and may be designed for an allowable bearing pressure of 2,500 pounds per square foot (psf). For design purposes, maximum total foundation settlement should be less than one inch for the assumed design loads less than 2,000 psf. Differential settlements between adjacent similarly loaded (DL + LL) footings with equal area are anticipated to be less than one-quarter inch. Due to the stiff silty clay of the foundation soils, the majority of the predicted settlement indicated above is expected to occur within a few months the total structural loads are applied.

4.5.2 Concrete Grade Beam

Concrete grade beam foundation should embedded a minimum of 18-inches and be designed using a net allowable bearing pressure of 2,000 pounds per square foot (psf). The allowable bearing pressure is applicable for the dead load plus live load (DL + LL) condition, and may be increased by 1/3 for wind or seismic loads. The following parameters may be used for designing reinforced concrete beams that are supported on firm engineered fill.

Parameter	Engineered Fill
Unit Weight (pcf)	120
Modulus of Subgrade Reaction (pci)	150
Modulus of Elasticity (psi)	3,000
Poisson's Ratio	0.35
Shear Modulus (psi)	1,100

Based on the planned embedment depths and design loads of the structures, we anticipate the total foundation settlements will be less than one inch and differential settlements will be less than one-quarter inch (1/4") over a distance of 30 feet.

Due to the stiff silty clay of the foundation soils, the majority of the predicted settlement indicated above is expected to occur within a few months the total structural loads are applied.

4.5.3 Deadman Block Footings

Deadman block footings should have a minimum width of 24 inches and extend a minimum depth of 24 inches below the lowest adjacent grade. Deadman footings may be designed for an allowable vertical bearing pressure of 2,500 pounds per square foot (psf) and may be designed with an allowable soil passive resistance of 250 pounds per square foot (psf) per foot of depth for lateral resistance. This value includes a minimum safety factor of 1.5 against lateral thrust. Blocks must be cast in undisturbed soil or engineered fill.

A coefficient of friction of 0.45 may be used between soil sub-grade and the bottom of footings. The coefficient of friction and passive earth pressure values given above represent ultimate soil strength values. BSK recommends that a safety factor consistent with the design conditions be included in their usage. For stability against lateral sliding that is resisted solely by the passive earth pressure against footings or friction along the bottom of footings, a minimum safety factor of 1.5 is recommended. For stability against lateral sliding that is resisted by combined passive pressure and frictional resistance, a minimum safety factor of 2.0 is recommended. For lateral stability against seismic loading conditions, a minimum safety factor of 1.2 is recommended.

4.7 Excavation Stability

Soils encountered within the depth explored are soil Type B or C in accordance with OSHA (Occupational Safety and Health Administration). The slopes surrounding or along temporary excavations may be vertical for excavations that are less than five feet deep, but should be no steeper than 1H:1V for excavations that are deeper than five feet, up to a maximum depth of 15 feet. Certified trench shields or boxes may also be used to protect workers during construction in excavations that have vertical sidewalls and are greater than 5 feet deep. Temporary excavations for the project construction should be left open for as short a time as possible and should be protected from water runoff. In addition, equipment and/or soil stockpiles must be maintained at least 10 feet away from the top of the excavations. Because of variability in soils, BSK should be afforded the opportunity to observe and document sloping and shoring conditions at the time of construction. Slope height, slope inclination, and excavation depths (including utility trench excavations) must in no case exceed those specified in local, state, or federal safety regulations,

(e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations).

4.8 SURFACE DRAINAGE CONTROL

The control of surface drainage at the project site is an important design consideration. BSK recommends the following:

- Landscaping should be carefully planned to provide positive and enduring drainage away from the foundations, minimize irrigation of the area within 5 feet of the structures, and prevent saturation of the soils immediately adjacent to or below the foundation areas. Unpaved landscape areas should be sloped with at least a 5 percent gradient away from the structure for a distance of at least 5 feet.
- Irrigation water should be applied in amounts not exceeding those required to offset evaporation, sustain plant life, and maintain a relatively uniform moisture profile around the perimeter of, and below, site improvements.

5.0 PLANS AND SPECIFICATIONS REVIEW

BSK recommends that it be retained to review the draft plans and specifications for the project, with regard to foundations and earthwork, prior to their being finalized and issued for construction bidding.

6.0 CONSTRUCTION TESTING AND OBSERVATIONS

Geotechnical testing and observation during construction is a vital extension of this geotechnical investigation. BSK recommends that it be retained for those services. Field review during site preparation and grading allows for evaluation of the exposed soil conditions and confirmation or revision of the assumptions and extrapolations made in formulating the design parameters and recommendations. BSK observations should be supplemented with periodic compaction tests to establish substantial conformance with these recommendations. BSK should also be called to the site to observe foundation excavations, prior to placement of reinforcing steel or concrete, in order to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report. BSK should also be called to the site to observe placement of foundation and slab concrete.

If a firm other than BSK is retained for these services during construction, that firm should notify the owner, project designers, governmental building officials, and BSK that the firm has assumed the responsibility for all phases (i.e., both design and construction) of the project within the purview of the geotechnical engineer. Notification should indicate that the firm has reviewed this report and any subsequent addenda, and that it either agrees with BSK's conclusions and recommendations, or that it will provide independent recommendations.

7.0 LIMITATIONS

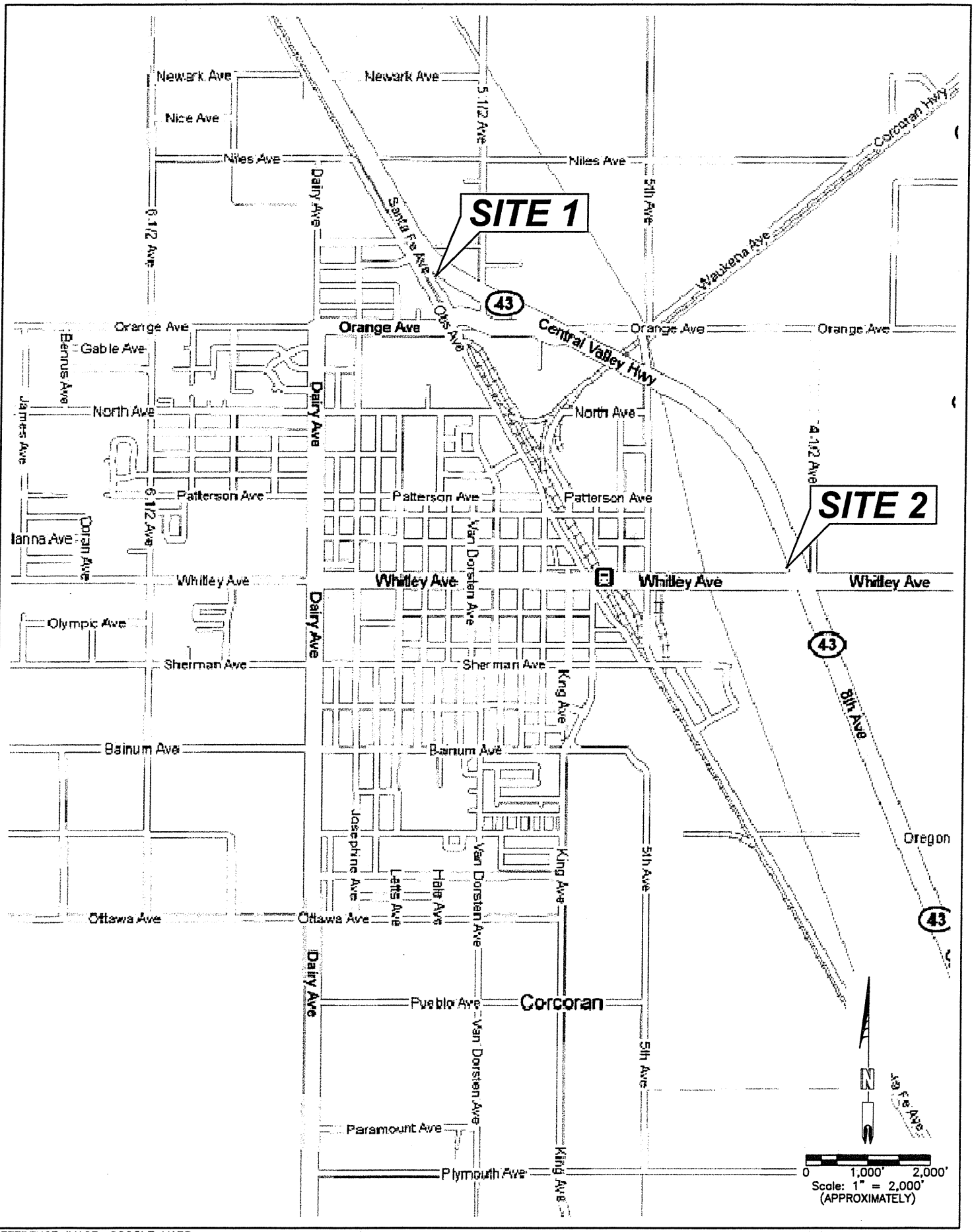
The analyses and recommendations submitted in this report are based upon the data obtained from the test borings performed at the locations shown on Figure 2. The report does not reflect variations which may occur between or beyond the borings. The nature and extent of such variations may not become evident until construction is initiated. If variations then appear, a re-evaluation of the recommendations of this report will be necessary after performing on-site observations during the excavation period and noting the characteristics of the variations.

The validity of the recommendations contained in this report is also dependent upon an adequate testing and observation program during the construction phase. BSK assumes no responsibility for construction compliance with the design concepts or recommendations unless it has been retained to perform the testing and observation services during construction as described above.

The findings of this report are valid as of the present. However, changes in the conditions of the site can occur with the passage of time, whether caused by natural processes or the work of man, on this property or adjacent property. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation, governmental policy or the broadening of knowledge.

BSK has prepared this report for the exclusive use of the Client and members of the project design team. The report has been prepared in accordance with generally accepted geotechnical engineering practices which existed in Kings County at the time the report was written. No other warranties either expressed or implied are made as to the professional advice provided under the terms of BSK's agreement with Client and included in this report.

Respectfully submitted,
BSK Associates



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REFERENCE IMAGE: GOOGLE MAPS

BSK

VICINITY MAP

Sign Monuments

Corcoran, California

FIGURE 1

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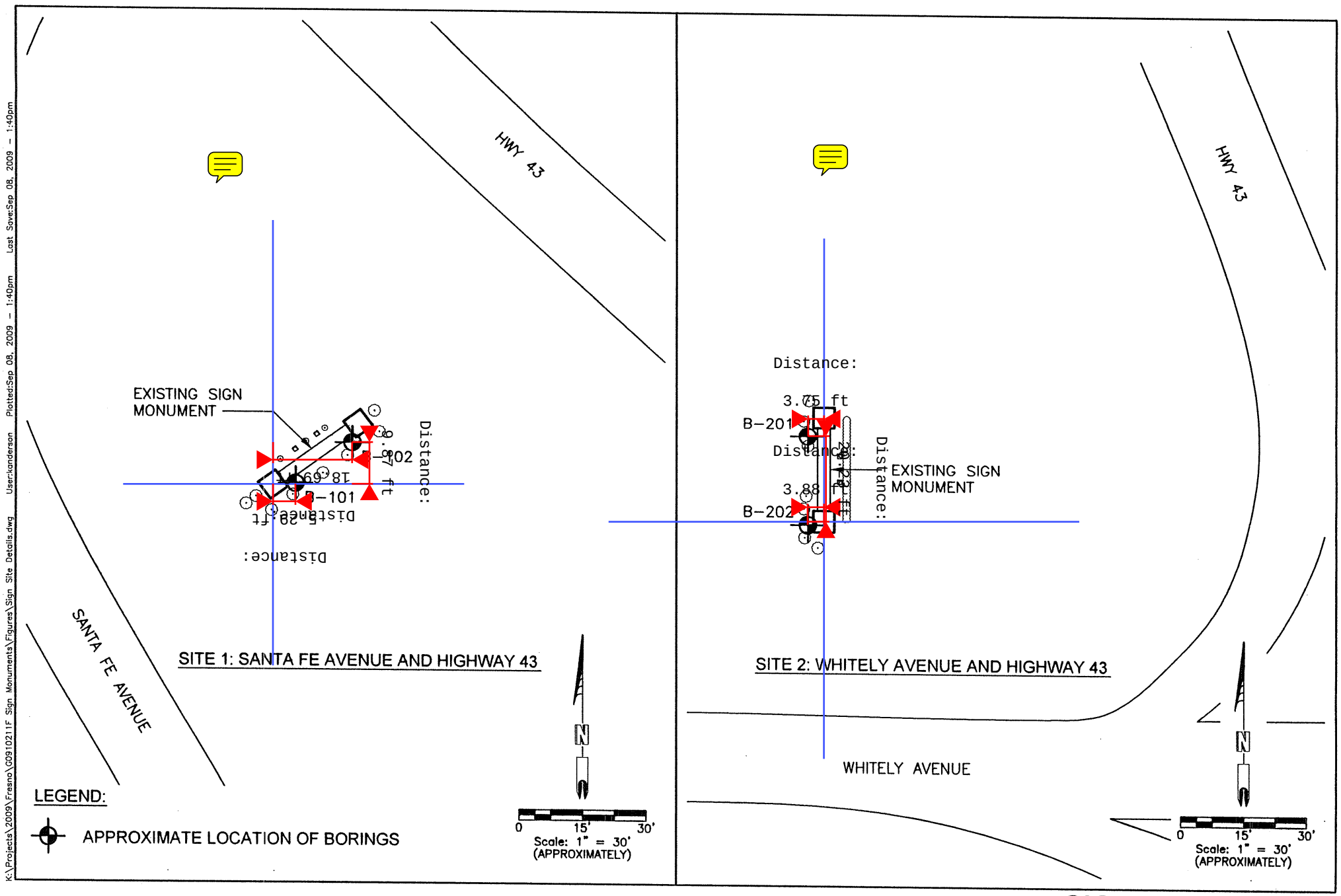

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BSK

SIGN SITE DETAILS

Sign Monuments

Corcoran, California

G09.102.11F | RKA | Sign Site Details.dwg | 09/08/09 | FIGURE 2

APPENDIX "A"

FIELD EXPLORATION

APPENDIX "A"

FIELD EXPLORATION

The field exploration was conducted on August 14, under the oversight of a BSK Staff Geologist. Two (2) test borings to 10 feet below ground surface (bgs) were drilled within each proposed sign monument using a 4-inch hand auger. The approximate locations of the test borings are indicated on Figure 2, Boring Location Map.

The soil materials encountered in the test borings were visually classified in the field, and logs were recorded by the staff geologist during the drilling and sampling operations. Visual classification of the materials encountered in the test borings were made in general accordance with the Unified Soil Classification System (ASTM D 2487). A soil classification chart is presented herein. Boring logs are presented herein and should be consulted for more details concerning subsurface conditions. Stratification lines were approximated by the field staff on the basis of observations made at the time of drilling while the actual boundaries between different soil types may be gradual and soil conditions may vary at other locations.

Subsurface samples were obtained at the successive depths shown on the boring logs by driving samplers which consisted of a 2.5-inch inside diameter (I.D.) California Sampler. The samplers were driven 6 inches using a hand driven slide hammer. The relatively undisturbed soil core samples were capped at both ends to preserve the samples at their natural moisture content. At the completion of the field exploration, the test borings were backfilled with the soil cuttings, as set forth in BSK's proposal.

MAJOR DIVISIONS					TYPICAL NAMES
COARSE GRAINED SOILS More than Half >#200	GRAVELS MORE THAN HALF COURSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP		POORLY GRADED GRAVELS, GRAVEL- SAND MIXTURES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC		CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COURSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS, GRAVELLY SANDS
			SP		POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC		CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAIN SOILS More than Half <#200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL		ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH		INORGANIC SILTS , MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS

Notes:
Dual symbols are used to indicate borderline soil classifications. Blow counts represent the number of blows a 140-pound hammer falling 30 inches required to drive a sampler through the last 12 inches of an 18 inch penetration, unless otherwise noted. The lines separating strata on the logs represent approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

■	Modified California	RV	R-Value
⊠	Standard Penetration Test (SPT)	SA	Sieve Analysis
☒	Split spoon	SW	Swell Test
◪	Pushed Shelby Tube	TC	Cyclic Triaxial
◧	Auger Cuttings	TX	Unconsolidated Undrained Triaxial
	Grab Sample	TV	Torvane Shear
⊘	Sample Attempt with No Recovery	UC	Unconfined Compression
CA	Chemical Analysis	(1.2)	(Shear Strength, ksf)
CN	Consolidation	WA	Wash Analysis
CP	Compaction	(20)	(with % Passing No. 200 Sieve)
DS	Direct Shear	▽	Water Level at Time of Drilling
PM	Permeability	▼	Water Level after Drilling (with date measured)
PP	Pocket Penetrometer		

SOIL CLASSIFICATION CHART AND KEY TO TEST DATA
Unified Soil Classification System

PLATE:

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LOG OF BORING NO. B-101

Project Name: **Proposed Sign Monuments**

Location: **Santa Fe and Hwy. 43**

Job Number: **G0910211F**

Surface El.:

Surface Description: Exposed dry soil

Depth, feet	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	MATERIAL DESCRIPTION	REMARKS
								Silty SAND (SM) Dark gray, fine to medium grained with trace of clay, dry	
				100	6.5			**Silty CLAY (CL)** Light gray, moist, stiff . . .increase in fine sand	
5				97	6.1			**SAND (SP)** Brown, fine to medium grained, moist, very dense, strongly cemented	
								Sandy CLAY (CL) Yellow brown, fine to medium grained, moist, hard	
10								Notes: 1) Boring terminated at 10 feet 2) Groundwater not encountered 3) Boring backfilled with soil cuttings	
15									
20									
25									

Completion Depth: **10.0**
Date Started: **8/14/09**
Date Completed: **8/14/09**
Logged By: **Marshall Robinson**
Checked By: **Lloyd Suehiro**

Drilling Equipment and Method: 4" Hand Auger and 2.4" I.D. Sampler
Sampler:
Hammer Type: Slide Hammer

GEOTECHNICAL 08 G0910211F PROPOSED SIGN MONUMENTS.GPJ GEOTECHNICAL 08.GDT 9/8/09

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LOG OF BORING NO. B-102

Project Name: **Proposed Sign Monuments**

Location: **Santa Fe and Hwy. 43**

Job Number: **G0910211F**

Depth, feet	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	MATERIAL DESCRIPTION	REMARKS
								Surface El.: **Surface** **Description:** Exposed dry soil	
								Silty SAND (SM) Dark gray, fine to medium grained, dry, firm	
				97	7.8			**Silty CLAY (CL)** Light gray, moist, stiff	
5					7.5			. . .increase in fine sand **SAND (SP)** Brown, fine to medium grained, moist, very dense	
								Sandy CLAY (CL) Yellow brown, fine to medium grained, moist, hard	
10								Notes: 1) Boring terminated at 10 feet 2) Groundwater not encountered 3) Boring backfilled with soil cuttings	
15									
20									
25									

Completion Depth: **10.0**
Date Started: **8/14/09**
Date Completed: **8/14/09**
Logged By: **Marshall Robinson**
Checked By: **Lloyd Suehiro**

Drilling Equipment and Method: 4" Hand Auger and 2.4" I.D. Sampler
Sampler:
Hammer Type: Slide Hammer

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LOG OF BORING NO. B-201

Project Name: **Proposed Sign Monuments**

Location: **Whitely and Hwy. 43**

Job Number: **G0910211F**

Surface El.:

Surface Description: Exposed dry soil

Depth, feet	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	MATERIAL DESCRIPTION	REMARKS
				80	19			**Silty CLAY (CL)** Dark gray, dry, hard . . .moist . . .increase in sand	
5				90	9.6			**SAND (SP)** Light gray, fine to medium grained, moist, dense **Silty CLAY (CL)** Dark gray, moist, hard	
								SAND (SP) \Light gray, fine to medium grained, moist, dense	
10								**Sandy CLAY (CL)** Yellow brown, fine grained, moist, hard	
15								Notes: 1) Boring terminated at 10 feet 2) Groundwater not encountered 3) Boring backfilled with soil cuttings	
20									
25									

Completion Depth: **10.0**
Date Started: **8/14/09**
Date Completed: **8/14/09**
Logged By: **Marshall Robinson**
Checked By: **Lloyd Suehiro**

Drilling Equipment and Method: 4" Hand Auger and 2.4" I.D. Sampler
Sampler:
Hammer Type: Slide Hammer

GEOTECHNICAL 08 G0910211F PROPOSED SIGN MONUMENTS.GPJ GEOTECHNICAL 08.GDT 9/8/09

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LOG OF BORING NO. B-202

Project Name: **Proposed Sign Monuments**
Location: **Whitely and Hwy. 43**
Job Number: **G0910211F**

Surface El.:
Surface
Description: Exposed dry soil

Depth, feet	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	MATERIAL DESCRIPTION	REMARKS
				75	19.3			**Silty CLAY (CL)** Dark gray, dry, hard . . .moist at 2.5 feet	
5				115	14.8			**SAND (SP)** Light gray, fine to medium grained, moist, dense **Silty CLAY (CL)** Dark gray, moist, hard	
10								**SAND (SP)** Light gray, fine to medium grained, moist, dense **Sandy CLAY (CL)** Yellow brown, fine grained, moist, hard	
15								Notes: 1) Boring terminated at 10 feet 2) Groundwater not encountered 3) Boring backfilled with soil cuttings	
20									
25									

Completion Depth: **10.0**
Date Started: **8/14/09**
Date Completed: **8/14/09**
Logged By: **Marshall Robinson**
Checked By: **Lloyd Suehiro**

Drilling Equipment and Method: 4" Hand Auger and 2.4" I.D. Sampler
Sampler:
Hammer Type: Slide Hammer

APPENDIX "B"

LABORATORY TESTING

APPENDIX "B"

LABORATORY TESTING

The results of laboratory testing performed in conjunction with this project are contained in this Appendix. The following laboratory tests were performed on representative samples in accordance with the latest applicable standards.

In-Situ Moisture and Density

The field moisture content and in-place dry density determinations were performed on relatively undisturbed samples obtained from the test borings. The field moisture content, as a percentage of dry weight of the soils, was determined by weighing the samples before and after oven drying in accordance with ASTM D2216 test procedures. Dry densities, in pounds per cubic foot, were also determined for undisturbed core samples in accordance with ASTM D 2937 test procedures. Test results are presented on the boring logs in Appendix A.

Direct Shear Test

A direct shear test was performed on test specimens trimmed from relatively undisturbed soil samples collected from Borings B-101 and B-202 at 2 feet below ground surface (bgs). The three-point shear tests were performed in general accordance with ASTM Test Method D 3080. The three test specimens, each 2.42 inches in diameter and 1 inch in height, were subjected to shear along a plane at mid-height after allowing for pore pressure dissipation. The results of this test are presented on Figure B-1 and Figure B-2.

Soil Corrosivity Tests

One soil sample was tested to evaluate the corrosion potential of the on-site soils. The test methods included: California Test Method 643 (for minimum resistivity) and EPA Test Methods 300.0 (for soluble sulfate and chlorides) and 9045C (for pH). The test results are summarized in the following table.

Location	Composite B-101 and B-102 at 1-5 feet	Composite B-201 and B-202 at 1-5 feet
pH	9.6	8.2
Sulfate (mg/Kg)	81	150
Chloride (mg/Kg)	30	87

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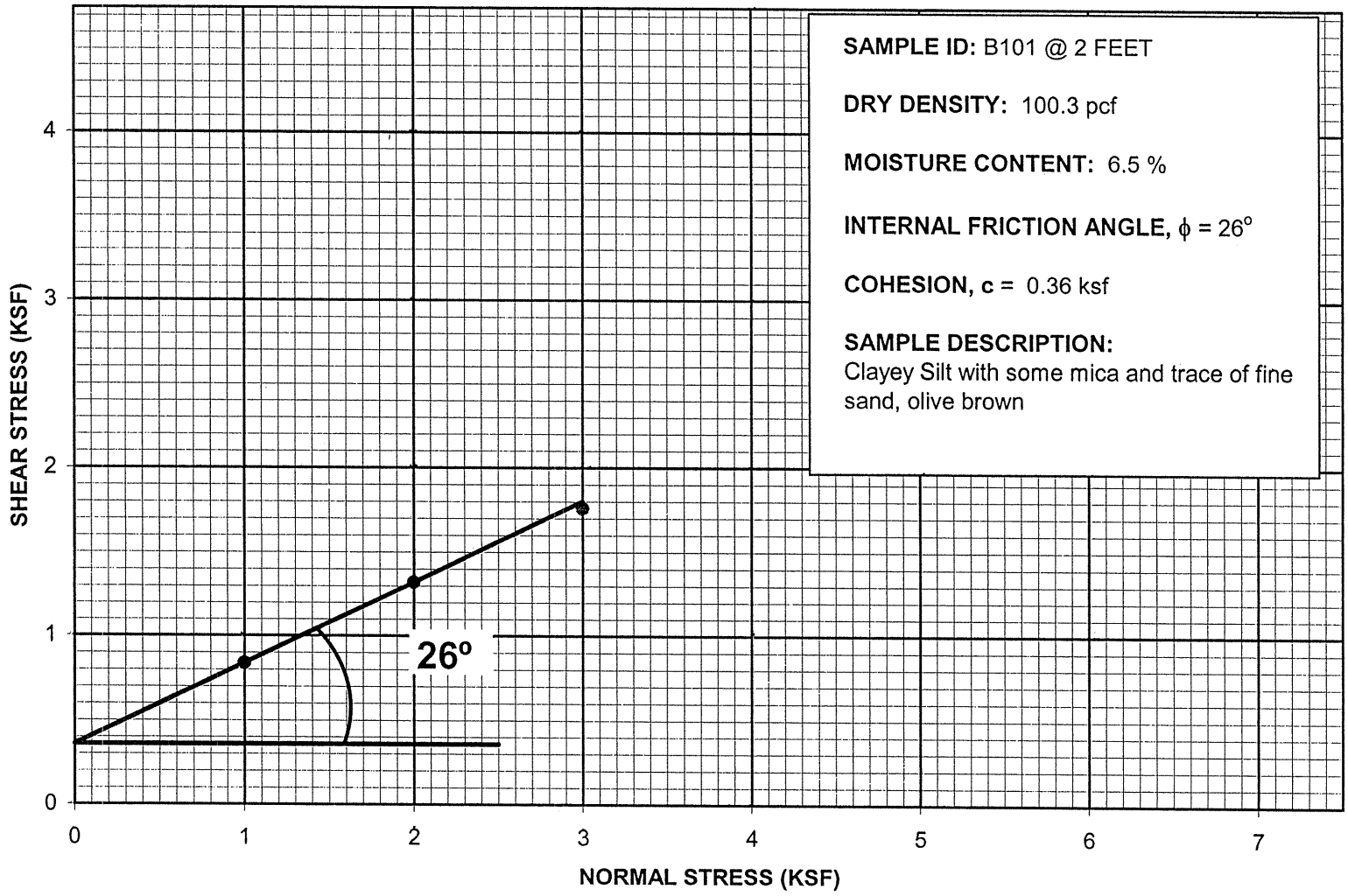
PROJECT: Corcoran Sign Monuments

FIGURE B-1
SAMPLE DATE: 08/14/09
TEST DATE: 08/24/09

SHEAR STRENGTH DIAGRAM
(ASTM D-3080: DIRECT SHEAR TEST)



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PROJECT: Corcoran Sign Monuments

FIGURE B-2
SAMPLE DATE: 08/14/09
TEST DATE: 08/24/09

SHEAR STRENGTH DIAGRAM
(ASTM D-3080: DIRECT SHEAR TEST)